

Amendments to the Claims

Please amend the claims as follows.

1-86. (canceled)

87. (currently amended) A method of fabricating a semiconductor device, comprising the steps of:

~~providing a support substrate having a first surface and a second surface, each surface having terminal pads located thereon;~~

~~providing a semiconductor die having a first surface with at least one standoff attached thereto, and a second surface, the at least one standoff being exposed and formed on only part of the first surface of the die; and~~

~~mounting the a second surface of the a die on the first surface of the a support substrate, the die having a first surface with at least one standoff attached thereto, the standoff being exposed and formed on only part of the first surface of the die.~~

88. (original) The method of Claim 87, wherein the die is flip chip mounted on the support substrate.

89. (currently amended) A method of fabricating a semiconductor device, comprising the steps of:

~~providing a support substrate having a first surface and a second surface;~~

~~providing a semiconductor die having a first surface and a second surface;~~

~~forming a standoff on the a first surface of the a die such that the standoff is exposed and formed on only part of the first surface of the die; and~~

~~mounting the second surface of the die on the a first surface of the a support substrate.~~

90. (currently amended) The method of Claim 89, wherein the step of forming the standoff comprises dispensing a material on the first surface of the die by a method selected from the group consisting of screen printing, stenciling, coating, masking, stamping, heat stamping, spray coating, and direct spreading.

91. (withdrawn - currently amended) The method of Claim 89, wherein ~~the step of~~ forming the standoff comprises a process selected from the group consisting of electroplating and anodizing.
92. (currently amended) The method of Claim 89, wherein ~~the step of~~ forming the standoff comprises dispensing a flowable material onto the die[;] and allowing the flowable material to solidify.
93. (original) The method of Claim 92, wherein the flowable material is dispensed using a liquid capillary.
94. (original) The method of Claim 92, wherein the flowable material is a curable thermoset polymeric material.
95. (original) The method of Claim 94, wherein the polymeric material is a novolac epoxy resin.
96. (withdrawn - currently amended) The method of Claim 89, wherein the standoff comprises a prefabricated object, and ~~the step of~~ forming the standoff comprises affixing the object to the surface of the die.
97. (withdrawn) The method of Claim 96, wherein the object is affixed using an adhesive material.
98. (withdrawn) The method of Claim 97, wherein the adhesive material comprises an adhesive paste.
99. (withdrawn) The method of Claim 97, wherein the adhesive material comprises a double-sided adhesive tape.

100. (withdrawn) The method of Claim 97, wherein the standoff comprises an adhesive-backed decal.
101. (withdrawn) The method of Claim 96, wherein the standoff comprises a thermally conductive material.
102. (withdrawn) The method of Claim 101, wherein the conductive material is selected from the group consisting of copper, aluminum, gold and silver.
103. (original) The method of Claim 102, wherein the standoff comprises a copper foil.
104. (original - currently amended) The method of Claim 89, wherein the standoff comprises a plastic material, and ~~the step of~~ forming the standoff comprises a process selected from the group consisting of injection molding, extrusion, blow molding, compression molding, transfer molding, and thermoforming.
105. (withdrawn - currently amended) The method of Claim 89, wherein ~~the step of~~ forming the standoff comprises an electroplating or anodizing process.
106. (withdrawn) The method or Claim 105, wherein the standoff comprises a thermally conductive material.
107. (withdrawn) The method or Claim 106, wherein the conductive material is selected from the group consisting of silver, copper, aluminum, gold and nickel.
108. (currently amended) The method of Claim 89, wherein the standoff is in the form of an enclosure, and the method further comprises ~~disposing~~ applying a heat sink material on the surface of the die within the standoff enclosure.
109. (original) The method of Claim 108, wherein the heat sink material comprises copper or aluminum.

110. (original) The method of Claim 109, comprising adhering a layer of copper foil to the surface of the die to form the heat sink.

111. (original) The method of Claim 89, wherein the die is flip chip mounted on the support substrate.

112. (withdrawn - currently amended) The method of Claim 89, further comprising:
~~providing a second semiconductor die having a first surface with at least one standoff affixed thereto, and a second surface; and~~
 mounting the a second surface of the a second die on the a second surface of the support substrate, wherein at least one standoff is affixed to the first surface of the second die and exposed on said die

113. (withdrawn - currently amended) A method of fabricating a semiconductor device, comprising ~~the steps of:~~
~~providing a support substrate;~~
~~providing a pair of semiconductor dies, each having a first surface and a second surface;~~
~~forming a standoff on the a first surface of each of the a pair of dies, wherein the standoffs are exposed and formed on only part of said first surfaces of the dies; and~~
~~mounting the dies on opposing sides of the a support substrate, the second surface of each of the dies situated on the substrate.~~

114. (withdrawn - currently amended) A method of fabricating a semiconductor die package, comprising ~~the steps of:~~
~~providing a die/substrate unit comprising a semiconductor die on a support substrate, the die having a first surface with one or more standoffs attached thereto, the standoffs having a height and on only part of the first surface of the die, and a second surface situated on the support substrate;~~

~~providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween, the mold plates having an inner surface;~~

positioning ~~the~~ a die/substrate unit within the a molding chamber of the a mold tooling, the die/substrate unit comprising a semiconductor die on a support substrate, the die having a first surface with one or more standoffs attached thereto, the standoffs having a height and on only part of the first surface of the die, and a second surface situated on the support substrate; and the mold tooling comprising a pair of mold plates defining the molding chamber therebetween, the mold plates having an inner surface, wherein with the standoffs are in contact with the inner surfaces of the mold plates; and

flowing a molding compound into the molding chamber to at least partially encapsulate the die/substrate unit, wherein the die/substrate unit is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

115. (withdrawn - currently amended) A method of fabricating a semiconductor die package, comprising the steps of:

~~providing a die/substrate unit comprising a semiconductor die on a support substrate, the die having a first surface with one or more standoffs attached thereto, the standoffs having a height and situated on only part of the first surface of the die, and a second surface situated on the support substrate;~~

~~providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween, the mold plates having an inner surface;~~

positioning ~~the~~ a die/substrate unit within a molding chamber between a pair of mold plates each having an inner surface, the die/substrate unit comprising a semiconductor die on a support substrate, the die having a first surface with one or more standoffs attached thereto, the standoffs having a height and situated on only part of the first surface of the die, and a second surface situated on the support substrate, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the die/substrate unit is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

116. (withdrawn - currently amended) A method of fabricating a semiconductor die package, comprising the steps of:

~~providing a die/substrate unit comprising a semiconductor die on a support substrate, the die having a first surface with one or more standoffs affixed thereto, the standoffs having a height and situated on only part of the first surface of the die, and a second surface situated on the support substrate;~~

~~providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween, the mold plates having an inner surface;~~

positioning the a die/substrate unit within a molding chamber between a pair of mold plates each having an inner surface, the die/substrate unit comprising a semiconductor die on a support substrate, the die having a first surface with one or more standoffs affixed thereto, the standoffs having a height and situated on only part of the first surface of the die, and a second surface situated on the support substrate, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the die/substrate unit is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

117. (withdrawn - currently amended) A method of fabricating a semiconductor die package, comprising the steps of:

~~providing a semiconductor device comprising a pair of semiconductor dies situated on opposing sides of a support substrate; each die having a first surface with one or more standoffs affixed to a part of the first surface, and a second surface situated on the support substrate;~~

~~providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween; the mold plates having an inner surface;~~

positioning the a semiconductor device within a molding chamber between a pair of mold plates each having an inner surface, the semiconductor device comprising a pair of semiconductor dies situated on opposing sides of a support substrate, each die having a first surface with one or more standoffs affixed to a part of the first surface, and a second surface

situated on the support substrate, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

118. (withdrawn - currently amended) A method of fabricating a semiconductor die package, comprising the steps of:

~~fabricating a semiconductor device by providing a pair of semiconductor dies, each having a first surface and a second surface, forming a standoff on a part of the first surface of each of the dies, and mounting the dies on opposing sides of a support substrate, the second surface of each of the dies situated on the substrate;~~

positioning the a semiconductor device within a molding chamber between a pair of mold plates each having an inner surface, the semiconductor device comprising a pair of semiconductor dies mounted on opposing sides of a support substrate, each die having a standoff attached to a portion of the surface of the each of the dies and exposed on said dies such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

119. (withdrawn - currently amended) A method of fabricating a semiconductor die package, comprising the steps of:

~~fabricating a semiconductor device by providing a pair of semiconductor dies, each die having a standoff attached to a part of a first surface of the die, and mounting the dies on opposing sides of a support substrate, the second surface of each of the dies situated on the substrate;~~

positioning the a semiconductor device within a molding chamber between a pair of mold plates each having an inner surface, the semiconductor device comprising a pair of dies, each die having a standoff attached to a portion of a first surface of the dies, the dies mounted on

opposing sides of a support substrate with the standoff exposed such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

120. (withdrawn - currently amended) A method of fabricating a semiconductor die package, comprising ~~the steps of:~~

~~providing a semiconductor device comprising a pair of semiconductor dies situated on opposing sides of a support substrate; each die having a first surface and a second surface situated on the support substrate;~~

~~providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween; each mold plate having an inner surface with a standoff situated thereon;~~

positioning ~~the~~ a semiconductor device within the a molding chamber between the a pair of mold plates defining a molding chamber therebetween, the semiconductor device comprising a pair of semiconductor dies situated on opposing sides of a support substrate, and each mold plate having an inner surface with a standoff situated thereon such that the standoffs are in contact with the first surfaces of the dies; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

121. (withdrawn - currently amended) A method of fabricating a semiconductor die package, comprising ~~the steps of:~~

~~fabricating a semiconductor device by providing a pair of semiconductor dies, each die having a standoff attached to a part of a first surface, and mounting the dies on opposing sides of a support substrate, the second surface of each of the dies situated on the substrate;~~

positioning ~~the~~ a semiconductor device within a molding chamber between a pair of mold plates each having an inner surface, the semiconductor device comprising a pair of semiconductor dies mounted on opposing sides of a support substrate, each die having a standoff attached to a part of a first surface and the second surface of each of the dies situated on the

support substrate, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

122. (currently amended) A method of fabricating a semiconductor die, comprising ~~the step of~~:

forming at least one standoff on a surface of the semiconductor die, the standoff being exposed and formed on only part of said surface of the die.

123. (currently amended) The method of Claim 122, wherein ~~the step of~~ forming the standoff comprises dispensing a material on the surface of the die by a method selected from the group consisting of screen printing, stenciling, coating, masking, stamping, heat stamping, spray coating, and direct spreading.

124. (withdrawn - currently amended) The method of Claim 122, wherein ~~the step of~~ forming the standoff comprises a process selected from the group consisting of electroplating and anodizing.

125. (currently amended) The method of Claim 122, wherein ~~the step of~~ forming the standoff comprises dispensing a flowable material onto the die[,] and allowing the flowable material to solidify.

126. (previously presented) The method of Claim 125, wherein dispensing the flowable material is by use of a liquid capillary.

127. (previously presented) The method of Claim 125, wherein the flowable material comprises a curable thermoset polymeric material.

128. (withdrawn - currently amended) The method of Claim 122, wherein ~~the step of~~ forming the standoff comprises mounting a prefabricated object to the surface of the die.

129. (withdrawn) The method of Claim 128, wherein the object is mounted using an adhesive paste, a double-sided adhesive tape, or a combination thereof.

130. (withdrawn) The method of Claim 128, wherein mounting the standoff comprises affixing an adhesive-backed object to the at least one surface of the die.

131. (withdrawn) The method of Claim 122, wherein the standoff comprises a thermally conductive material.

132. (withdrawn) The method of Claim 122, wherein the standoff comprises a conductive material selected from the group consisting of copper, aluminum, gold and silver.

133. (withdrawn) The method of Claim 132, wherein the standoff comprises a copper foil.

134. (previously presented) The method of Claim 122, wherein the standoff comprises a plastic material.

135. (previously presented) The method of Claim 122, further comprising forming ball contacts on a second surface of the die.

136. (previously presented) The method of Claim 122, further comprising mounting the die on a support substrate.

137. (currently amended) A method of fabricating a semiconductor die, comprising ~~the steps of~~:

forming at least one standoff on a surface of the die, the standoff being in the form of an enclosure; and

forming a heat sink within the standoff enclosure.

138. (previously presented) The method of Claim 137, wherein the heat sink comprises copper or aluminum.

139. (currently amended) The method of Claim 137, wherein ~~the step of forming the heat sink~~ comprises adhering a layer of copper foil to the surface of the die within the standoff enclosure.

140. (currently amended) A method of fabricating a semiconductor device, comprising ~~the steps of:~~

~~forming~~ affixing at least one standoff ~~affixed~~ onto a first surface of the die, the standoff being exposed and ~~formed on~~ affixed only on a part of the first surface of the die; and mounting a second surface of the die on a first surface of a support substrate.

141. (previously presented) The method of Claim 140, wherein the support substrate comprises a flexible material.

142. (previously presented) The method of Claim 141, wherein the support substrate comprises a polyimide film.

143. (previously presented) The method of Claim 140, wherein the support substrate comprises a rigid material.

144. (previously presented) The method of Claim 143, wherein the rigid material is selected from the group consisting of a polymer material, ceramic material, metal clad fiber board, and metal leadframe.

145. (previously presented) The method of Claim 144, wherein the support substrate comprises a polymer material selected from the group consisting of bismaleimide triazine resin, epoxy resin, FR-4 laminate, and FR-5 laminate.

146. (previously presented) The method of Claim 140, further comprising forming external contacts on the second surface of the support substrate.

147. (previously presented) The method of Claim 146, further comprising mounting the external contacts on the support substrate onto a second support substrate.

148. (currently amended) A method of fabricating a semiconductor device, comprising the steps of:

forming affixing at least one standoff ~~affixed~~ onto a first surface of the die, the standoff being exposed and ~~formed on~~ affixed only on a part of the first surface of the die; and

mounting a second surface of the die on a first surface of a support substrate, the support substrate having contact pads on a second surface and an opening to expose bond pads on the second surface of the die; and

connecting the bond pads on the second surface of the die through the opening to the contact pads on the second surface of the support substrate.

149. (currently amended) The method of Claim 148, further comprising ~~the step of~~ encapsulating at least the connection between the bond pads and the contact pads.

150. (previously presented) The method of Claim 148, further comprising forming external contacts on the second surface of the support substrate.

151. (currently amended) A method of fabricating a semiconductor device, comprising the steps of:

forming affixing at least one standoff ~~affixed~~ onto a surface of the die, the standoff being exposed on the die and ~~formed on~~ affixed only on a part of ~~the first said~~ surface of the die;

mounting an opposing surface of the die on a support substrate; and

connecting bond pads on the die to contact pads on the support substrate.

152. (withdrawn - currently amended) The method of Claim 92, wherein ~~the step of~~ forming the standoff comprises dispensing the flowable material by a method selected from the group

consisting of screen printing, stenciling, coating, masking, stamping, heat stamping, spray coating, and direct spreading.

153. (withdrawn - currently amended) The method of Claim 122, wherein ~~the step of~~ forming the standoff comprises dispensing the flowable material by a method selected from the group consisting of screen printing, stenciling, coating, masking, stamping, heat stamping, spray coating, and direct spreading.

154. (currently amended) A method of fabricating a die, comprising ~~the step of~~ forming a standoff on a portion of a surface of the die, the standoff having a sufficient height and exposed on the die such that when the die is positioned in a mold cavity between two mold plates, the at least one standoff contacts an inner surface of one of the mold plates.

155. (currently amended) A method of fabricating a die, comprising ~~the step of~~ forming a plurality of standoffs on a surface of the die.

156. (currently amended) A method of fabricating a die, comprising ~~the step of~~ forming a plurality of standoffs on a surface of the die, the standoffs being raised structures affixed to the surface of the die to maintain the surface of the die spaced apart from a mold plate during a die encapsulation process.

157. (currently amended) A method of fabricating a die, comprising ~~the step of~~ forming a plurality of standoffs on a surface of the die, the standoffs being raised structures and exposed on the die to effectively contact an inner surface of a mold such that the surface of the die is spaced apart from the inner surface of the mold.